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METEOROLOGICAL DATA REPORT

AEROBEE NASA 4.95 GS
(20 May 1966)

BY

GORDON L. DUNAWAY

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ATMOSPHERIC SCIENCES LABORATORY
WHITE SANDS MISSILE RANGE, NEW MEXICO

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METEOROLOGICAL DATA REPORT

AEROBEE NASA 4.95 GS
(20 May 1966)

By

Gordon L. Dunaway

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June 1966

DA Task IV650212A127-02

ATMOSPHERIC SCIENCES LABORATORY
WHITE SANDS MISSILE RANGE, NEW MEXICO

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ABSTRACT

Meteorological data gathered for the launching of Aerobee NASA 4.95 GS are presented for the National Aeronautics and Space Administration and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.

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INTRODUCTION

Aerobee NASA 4.95 GS was launched by Naval Ordnance Missile Test Facility personnel, White Sands Missile Range (WSMR), New Mexico, at 0810 hours MST, 20 May 1966.

Meteorological data used in conjunction with theoretical calculations to predict rocket impact were collected by the Meteorological Support Division, Atmospheric Sciences Laboratory, White Sands Missile Range, New Mexico. The Ballistic Meteorologists for this firing were Gordon L. Dunaway and Stanley F. Kubinski.

DISCUSSION

Wind data for the first 4,000 feet above the surface were obtained from a Double-Theodolite Wind Velocity Computer System (1). Balloons released at the launch site were observed and tracked from a 2,000-foot baseline. Continuous angular data were transmitted from two electrically instrumented theodolites to a computer where the data were reduced to obtain a velocity-vs-height relationship. The computer output drives two recorders which trace north-south and east-west components on a specially designed wind velocity computer ballistic chart. It is possible to read directly from the chart both the mean wind component values and the mean ballistic wind components in the various ballistic layers.

Temperature, pressure and humidity data, along with upper wind data from 4,000 to approximately 100,000 feet above the surface, were obtained from standard rawinsonde operations.

Mean wind component values in each ballistic zone were determined from vertical cross sections by equal-area method.

Data appearing in Tables IX, X and XI, are based on the L. D. Duncan (2) theory. The "Predicted Impact" includes, when applicable, an adjustment of impact based on the experience of the Ballistic Meteorologists and the forecast of firing time wind conditions.

REFERENCES

1. "Double-Theodolite Wind Velocity Computer", UNCLASSIFIED, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey, July 1959.
2. Duncan, L. D. and R. J. Ensey, November 1964: "Six Degree of Freedom Digital Simulation Model for Unguided Fin-Stabilized Rockets". ERDA-196, Environmental Sciences Directorate, United States Army Electronics Research and Development Activity, White Sands Missile Range, New Mexico.

PAYLOAD	Includes Nosecone Weight	269.0	Pounds
*UNIT WIND EFFECT	Cross	3.21	Miles/MPH
	Range	3.78	Miles/MPH
TOWER TILT EFFECT		17.0	Miles/Degree
BURNOUT	Velocity	5,265	Feet/Second
	Altitude	119,850	Feet MSL
	Time	51.8	Seconds
PEAK	Altitude	105	Miles MSL
	Time	220	Seconds
TOTAL FLIGHT TIME		452	Seconds
CORIOLIS EFFECT	West	4.6	Miles

TABLE I. THEORETICAL ROCKET PERFORMANCE VALUES
AEROBEE NASA 4.95 GS

* An empirical correction (85 percent of the total) has been made to the cross-unit wind effect. This correction was determined from statistical studies.

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
143- 250	.185
250- 400	.115
400- 600	.100
600- 800	.062
800-1200	.053
1200-1600	.031
1600-2000	.025
2000-2500	.029
2500-3000	.023

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
3000- 3500	.019
3500- 4000	.016
4000- 5000	.031
5000-10000	.096
10000-15000	.056
15000-20000	.033
20000-25000	.023
25000-30000	.017
30000-35000	.014

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
35000- 40000	.009
40000- 45000	.006
45000- 50000	.012
50000- 60000	.010
60000- 70000	.009
70000- 80000	.007
80000- 90000	.008
90000-100000	.010

TABLE II. BALLISTIC FACTORS
AEROBEE NASA 4.95 GS

TIME IN MINUTES	ANEMOMETER-MEASURED WIND	
	Speed (Knots)	Direction (Degrees)
T - 15	3.0	295
T - 10	4.0	282
T - 5	5.0	245
T - Time	4.0	268
T + 5	6.5	240
T + 10	8.0	242
T + 15	7.5	243

TABLE III. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION
AEROBEE NASA 4.95 GS

NOTE: Wind speeds and directions are 5-minute averages
centered at indicated times.

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	1 0510 MST		2 0540 MST		3 0610 MST		4 0620 MST		5 0650 MST		6 0710 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	12.0S	0.5E	13.0S	1.0W	3.0N	0.5W	2.0N	2.5E	3.0N	1.0E	6.5N	1.5E
250- 400	17.0	3.0	17.0	2.5E	0.5	2.0	5.0	2.0W	2.0	1.0	4.0	0.0
400- 600	24.0	1.5	22.0	0.0	1.5	2.5	5.5	5.5	1.0S	1.5	0.0	1.5W
600- 800	23.0	1.0W	21.0	1.0W	8.0S	4.5	1.5	2.5	4.0	0.5W	6.0S	2.5
800-1200	22.0	1.5	16.0	1.5	11.0	2.5	11.0S	2.0	9.0	3.5	14.5	0.0
1200-1600	25.0	1.5E	18.0	1.5	9.0	2.0	19.0	5.5E	14.0	5.5	17.0	0.5W
1600-2000	30.0	3.0W	11.0	12.0	6.0	4.0	11.0	1.5	9.0	3.5	14.5	0.5
2000-2500	12.0	13.0	21.0	11.5	7.0	7.5	9.5	0.5W	5.0	6.5	12.5	3.5
2500-3000	20.0	11.0	16.0	15.5	8.0	12.0	18.0	0.5	1.0N	6.5	4.0	1.5
3000-3500	17.0	14.5	10.0	15.5	5.0	11.0	10.0	11.5	1.0	1.5	2.5	1.5
3500-4000	23.0	15.0	20.0	15.5	10.0	8.0	2.0	11.5	3.0S	4.5	1.5	2.0

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA
(DOUBLE-THEODOLITE METHOD)
AEROBEE NASA 4.95 GS

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	7		8		9		10		11		12	
	0725 MST		0738 MST		0750 MST		0800 MST		0805 MST		0811 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	6.5N	0.0	3.0N	0.5E	2.5N	1.5E	0.5N	1.5W	2.5S	2.0W	1.5S	3.0W
250- 400	3.0	0.0	4.0	0.5	4.5	5.5W	6.0S	6.0	5.5	6.0	3.0	2.0
400- 600	5.5S	2.5W	3.5S	3.0W	3.0S	4.5	6.5	7.5	3.0	5.0	3.5	4.0
600- 800	7.0	5.0	0.5	0.5	5.0	5.0	5.0	6.5	3.0	2.5	0.5N	2.0
800-1200	13.5	3.0	10.0	3.0	6.5	7.5	4.5	2.5	9.0	8.5	9.5S	8.0
1200-1600	13.0	6.0	10.5	4.0	10.0	6.5	11.5	5.5	8.5	8.5	7.0	10.5
1600-2000	11.0	3.0	10.0	7.0	12.0	9.5	7.5	7.5	10.5	9.0	1.0	7.5
2000-2500	3.0	2.0	5.5	7.0	6.0	6.0	2.5	5.0	4.0	6.5	4.0	6.0
2500-3000	5.5	5.0	2.5	6.0	3.0	9.5	2.0	2.0	3.5	3.5	1.5	0.5E
3000-3500	4.0	5.0	0.5	1.5	4.0	3.0	3.5	1.5E	3.5	0.5E	3.5	2.5W
3500-4000	7.5	6.5	0.0	0.5	1.5	2.0	5.5	1.5	4.5	1.5W	2.0	7.0

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA (Cont)
(DOUBLE-THEODOLITE METHOD)
AEROBEE NASA 4.95 GS

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS	
	1	
	0710 MST	
	N-S	E-W
4000- 5000	0.0	2.0W
5000-10000	4.0N	10.5
10000-15000	0.0	6.0
15000-20000	2.5S	13.0

TABLE V. UPPER AIR DATA (4,000-20,000 FT)
AEROBEE NASA 4.95 GS

8

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS					
	1		2*		3	
	0230 MST		0500 MST		0810 MST	
	N-S	E-W	N-S	E-W	N-S	E-W
4000- 5000	13.0S	15.5W	4.0S	10.5W	2.0S	6.0W
5000- 10000	0.0	15.0	3.0N	8.5	7.0N	4.0
10000- 15000	13.0N	2.5	8.0	2.5	4.0	0.5E
15000- 20000	12.0	0.0	7.5S	12.0	7.5S	13.0W
20000- 25000	14.5S	12.0W	10.5	18.0	2.5	15.0
25000- 30000	27.0	22.5	10.5	18.0	9.0	24.0
30000- 35000	32.0	27.0	10.5	18.0	7.0	40.5
35000- 40000	23.5	40.5	11.0	19.0	15.5	42.5
40000- 45000	18.5	50.5	9.5	54.0	16.5	46.0
45000- 50000	21.5	37.0	15.5	43.0	14.0	38.5
50000- 60000	5.5	31.5	0.0	18.0	14.0	17.0
60000- 70000	7.0N	2.5E	5.5N	9.5E	9.0	0.0
70000- 80000	5.5S	4.5	INSTRUMENT		5.0	6.0E
80000- 90000	6.5	7.5	FAILURE		2.0	11.0
90000-100000	6.0	10.5			4.5	12.0

TABLE VI. UPPER AIR DATA (4,000-100,000 FT)
AEROBEE NASA 4.95 GS

* Rawin, telecompute data not available.

UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL
 00 MAY 66 0230 HRS MST
 ASCENSION NO. 357

3914014
 WHITE SANDS SITE
 TABLE VII

WSTM SITE COORDINATES
 E 488,562 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
3989.0	877.4	17.4	6.3	48.0	1047.8	665.1		150.0	1.9	1.000276
4000.0	877.1	17.5	6.3	47.7	1047.1	665.2		150.2	2.0	1.000276
4500.0	861.6	19.6	5.6	39.9	1021.5	667.5		160.5	5.5	1.000268
5000.0	846.3	18.7	4.7	39.5	1006.4	666.5		170.8	9.1	1.000262
5500.0	831.2	17.8	3.8	39.2	991.7	665.4		181.1	12.6	1.000257
6000.0	816.5	17.0	2.9	38.9	977.1	664.4		191.4	16.1	1.000252
6500.0	802.0	16.1	2.0	38.5	962.8	663.3		200.9	16.8	1.000246
7000.0	787.7	15.2	1.1	38.2	948.8	662.3		210.2	17.3	1.000242
7500.0	773.7	14.3	0.2	37.9	934.9	661.2		219.2	17.9	1.000237
8000.0	760.0	13.5	-1.7	37.5	921.2	660.2		228.7	18.3	1.000232
8500.0	746.5	12.6	-1.6	37.2	907.7	659.1		232.4	18.5	1.000227
9000.0	733.0	11.6	-2.4	37.6	894.6	657.9		237.1	17.8	1.000223
9500.0	719.5	10.4	-3.0	38.9	882.0	656.5		241.5	16.8	1.000220
10000.0	706.2	9.1	-3.7	41.2	869.5	655.0		245.6	15.1	1.000216
10500.0	693.2	7.9	-4.5	41.6	857.2	653.6		250.2	13.5	1.000212
11000.0	680.4	6.7	-5.0	42.9	845.1	652.2		255.9	11.8	1.000209
11500.0	667.6	5.5	-5.7	44.2	833.2	650.7		266.4	10.7	1.000205
12000.0	655.2	4.3	-6.5	45.6	821.4	649.3		279.5	9.8	1.000202
12500.0	643.4	3.1	-7.2	46.9	809.9	647.8		294.9	9.9	1.000198
13000.0	631.5	1.9	-8.0	48.2	798.5	646.4		309.3	10.2	1.000195
13500.0	619.9	0.6	-8.7	49.6	787.3	644.9		319.9	10.7	1.000191
14000.0	608.5	-0.6	-9.5	50.9	776.3	643.4		328.8	10.9	1.000188
14500.0	597.2	-1.8	-10.2	52.7	765.4	642.0		335.8	10.6	1.000185
15000.0	585.8	-3.1	-10.5	56.8	754.4	640.4		343.1	10.6	1.000182
15500.0	574.6	-4.4	-10.8	60.9	743.6	638.9		357.5	10.8	1.000180
16000.0	563.7	-5.7	-11.3	65.0	733.0	637.4		353.1	11.9	1.000177
16500.0	552.7	-6.9	-12.5	65.0	722.2	635.8		355.0	13.0	1.000173
17000.0	541.9	-8.2	-13.9	63.8	711.6	634.3		355.2	14.1	1.000170
17500.0	531.4	-9.4	-15.3	62.5	701.1	632.7		353.2	14.5	1.000166
18000.0	521.0	-10.7	-16.8	61.2	690.8	631.2		349.2	14.4	1.000163

UPPER AIR DATA
3914014
WHITE SANDS SITE
TABLE VII (Cont)

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0230 HRS MST
ASCENSION NO. 357

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DIRECTION DEGREES(TN)	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS		SPEED KNOTS		
18500.0	516.8	-11.9	-18.2	59.9	080.6	629.7		343.0	12.6		1.000160
19000.0	500.9	-13.2	-19.7	58.6	670.6	628.1		336.0	10.2		1.000157
19500.0	491.0	-13.9	-19.2	65.1	659.3	627.2		319.2	8.3		1.000154
20000.0	481.3	-14.2	-17.1	79.1	646.7	627.0		299.3	6.8		1.000153
20500.0	471.6	-15.1	-17.8	80.8	636.1	625.8		271.1	7.2		1.000150
21000.0	462.1	-16.2	-18.9	80.5	626.0	624.5		250.0	8.3		1.000147
21500.0	452.8	-17.3	-20.0	80.2	616.1	623.1		249.2	9.8		1.000144
22000.0	443.7	-18.4	-21.1	80.0	606.3	621.8		244.6	10.4		1.000142
22500.0	434.7	-19.5	-22.2	79.7	596.7	620.4		240.1	11.1		1.000139
23000.0	426.0	-20.6	-23.4	79.4	587.2	619.0		235.6	11.8		1.000136
23500.0	417.4	-21.7	-24.5	79.2	577.9	617.7		231.6	12.8		1.000134
24000.0	408.9	-22.9	-25.5	79.7	568.8	616.2		228.3	14.2		1.000131
24500.0	400.5	-24.1	-26.5	81.8	559.9	614.7		226.8	15.7		1.000129
25000.0	392.2	-25.4	-27.5	83.9	551.2	613.1		226.7	17.2		1.000127
25500.0	384.1	-26.7	-28.4	85.9	542.6	611.5		227.1	18.4		1.000125
26000.0	376.1	-27.9	-30.2	81.6	534.0	610.0		227.7	19.4		1.000122
26500.0	368.2	-29.0	-32.9	70.6	525.3	608.5		228.5	19.9		1.000119
27000.0	360.4	-30.2	-35.7	59.5	516.8	607.0		229.4	19.9		1.000117
27500.0	352.8	-31.5	-37.7	54.6	508.4	605.4		230.6	20.3		1.000115
28000.0	345.2	-32.7	-39.3	52.6	500.1	603.8		232.0	20.9		1.000113
28500.0	337.8	-34.0	-40.9	50.6	492.0	602.2		233.0	22.1		1.000111
29000.0	330.5	-35.2	-42.4	48.6	484.0	600.6		233.8	23.6		1.000109
29500.0	323.4	-36.5	-44.0	46.6	476.1	599.0		232.7	26.1		1.000107
30000.0	316.5	-37.7	-45.2	46.4	468.3	597.5		231.1	29.0		1.000105
30500.0	309.5	-38.8	-45.0	52.8	460.2	596.1		228.3	31.8		1.000103
31000.0	302.8	-39.9	-45.1	59.0	452.3	594.7		225.3	34.5		1.000101
31500.0	296.0	-41.3	-46.5	58.5	444.8	592.9		222.0	36.7		1.000100
32000.0	289.5	-42.7	-47.8	58.0	437.5	591.2		218.7	38.8		1.000098
32500.0	283.0	-44.0	-49.2	57.5	430.3	589.4		216.0	39.7		1.000096
33000.0	276.7	-45.4	-50.6	56.4**	423.2	587.7		214.3	40.7		1.000095

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3969.0 FEET MSL
20 MAY 60 0230 HRS MST
ASCENSION NO. 57

UPPER AIR DATA
3914314
WHITE SANDS SITE
TABLE VII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
33500	270.4	-40.5	-53.9	43.0**	415.7	530.4	215.1	215.1	41.9	1.0000093
34000	264.3	-47.7	-57.8	30.8**	418.4	534.0	216.6	216.6	42.4	1.0000091
34500	258.2	-48.9	-63.0	18.0**	411.3	533.1	218.7	218.7	42.3	1.0000089
35000	252.4	-50.1	-72.7	5.2**	394.2	531.0	221.2	221.2	41.6	1.0000088
35500	246.5	-51.2	0.	0.	387.0	531.1	223.9	223.9	40.8	1.0000086
36000	240.8	-52.2	0.	0.	379.7	528.8	225.7	225.7	39.7	1.0000085
36500	235.2	-53.2	0.	0.	372.5	527.5	227.5	227.5	38.6	1.0000083
37000	229.7	-54.2	0.	0.	365.5	526.2	228.8	228.8	39.1	1.0000081
37500	224.4	-55.2	0.	0.	358.0	524.4	230.4	230.4	39.9	1.0000080
38000	219.1	-55.6	0.	0.	351.2	524.1	233.8	233.8	42.4	1.0000078
38500	213.9	-56.1	0.	0.	343.3	523.7	237.1	237.1	44.5	1.0000076
39000	208.8	-56.4	0.	0.	335.7	523.3	240.3	240.3	46.1	1.0000075
39500	203.9	-56.7	0.	0.	328.2	522.9	243.5	243.5	46.8	1.0000073
40000	199.	-57.0	0.	0.	320.8	522.9	246.5	246.5	47.2	1.0000071
40500	194.3	-57.3	0.	0.	313.7	522.1	249.0	249.0	47.7	1.0000070
41000	189.7	-57.6	0.	0.	306.7	521.0	250.7	250.7	48.3	1.0000068
41500	185.2	-57.9	0.	0.	299.4	521.2	253.4	253.4	49.3	1.0000067
42000	180.8	-58.2	0.	0.	293.1	521.0	256.8	256.8	50.6	1.0000065
42500	176.5	-58.3	0.	0.	286.0	520.4	259.4	259.4	53.0	1.0000064
43000	172.3	-58.6	0.	0.	279.9	520.3	259.0	259.0	55.6	1.0000062
43500	168.2	-58.4	0.	0.	272.9	520.0	242.3	242.3	59.0	1.0000061
44000	164.2	-59.3	0.	0.	267.0	509.4	241.8	241.8	62.2	1.0000060
44500	160.3	-60.3	0.	0.	262.3	508.1	242.7	242.7	63.9	1.0000058
45000	156.4	-61.2	0.	0.	257.1	506.9	243.9	243.9	65.0	1.0000057
45500	152.7	-61.2	0.	0.	252.9	506.9	243.4	243.4	64.0	1.0000056
46000	149.0	-61.0	0.	0.	244.7	507.1	246.6	246.6	61.1	1.0000054
46500	145.4	-60.9	0.	0.	238.0	507.3	247.4	247.4	55.9	1.0000053
47000	141.9	-60.7	0.	0.	232.7	507.5	251.5	251.5	52.1	1.0000052
47500	138.5	-60.0	0.	0.	227.0	507.7	252.1	252.1	49.5	1.0000051
48000	135.2	-60.4	0.	0.	221.4	507.9	250.0	250.0	47.1	1.0000049

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 20 MAY 66 0230 HRS MST
 ASCENSION NO. 357

UPPER AIR DATA
 3914014
 WHITE SANDS SITE
 TABLE VII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
						KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
48500.0	131.9	-60.3	0.	-0.	215.9	508.1	247.6	247.6	44.9	1.0000048
49000.0	128.7	-60.1	0.	-0.	215.5	508.3	245.7	245.7	43.9	1.0000047
49500.0	125.0	-59.9	0.	-0.	215.3	508.5	244.4	244.4	43.6	1.0000046
50000.0	122.0	-59.8	0.	-0.	210.2	508.8	240.5	240.5	42.7	1.0000045
50500.0	119.7	-59.6	0.	-0.	195.3	509.0	235.4	235.4	41.7	1.0000043
51000.0	116.8	-59.6	0.	-0.	190.5	509.1	234.0	234.0	41.7	1.0000042
51500.0	113.9	-60.5	0.	-0.	186.7	507.8	233.0	233.0	42.0	1.0000042
52000.0	111.2	-61.4	0.	-0.	183.0	506.6	233.1	233.1	43.9	1.0000041
52500.0	108.5	-62.4	0.	-0.	179.3	505.3	233.8	233.8	45.4	1.0000040
53000.0	105.8	-63.3	0.	-0.	175.7	504.0	236.3	236.3	45.8	1.0000039
53500.0	103.2	-64.2	0.	-0.	172.2	502.8	238.8	238.8	46.4	1.0000038
54000.0	100.7	-65.2	0.	-0.	168.7	501.5	241.2	241.2	48.0	1.0000038
54500.0	98.3	-66.1	0.	-0.	165.4	500.3	243.8	243.8	49.0	1.0000037
55000.0	95.9	-67.1	0.	-0.	162.1	559.0	246.9	246.9	48.1	1.0000036
55500.0	93.5	-67.2	0.	-0.	158.2	558.8	250.1	250.1	47.1	1.0000035
56000.0	91.2	-66.9	0.	-0.	154.1	559.1	252.3	252.3	45.5	1.0000034
56500.0	88.9	-66.7	0.	-0.	150.1	559.5	254.5	254.5	43.9	1.0000033
57000.0	86.7	-66.4	0.	-0.	146.1	559.9	255.3	255.3	41.3	1.0000033
57500.0	84.6	-67.0	0.	-0.	142.9	559.1	255.0	255.0	37.9	1.0000032
58000.0	82.5	-68.0	0.	-0.	140.1	557.7	253.6	253.6	34.7	1.0000031
58500.0	80.4	-69.1	0.	-0.	137.3	556.2	250.0	250.0	31.8	1.0000031
59000.0	78.4	-70.1	0.	-0.	134.5	554.8	246.5	246.5	29.0	1.0000030
59500.0	76.4	-71.2	0.	-0.	131.8	553.4	243.0	243.0	26.3	1.0000029
60000.0	74.5	-70.7	0.	-0.	128.2	554.1	241.1	241.1	23.8	1.0000029
60500.0	72.7	-69.7	0.	-0.	124.5	555.4	243.9	243.9	21.4	1.0000028
61000.0	70.9	-68.8	0.	-0.	120.8	556.7	246.9	246.9	18.9	1.0000027
61500.0	69.1	-67.8	0.	-0.	117.3	558.0	250.6	250.6	15.7	1.0000026
62000.0	67.4	-66.9	0.	-0.	113.8	559.3	254.1	254.1	12.7	1.0000025
62500.0	65.7	-65.9	0.	-0.	110.5	560.5	256.5	256.5	11.0	1.0000025
63000.0	64.1	-65.0	0.	-0.	107.3	561.8	258.9	258.9	9.4	1.0000024

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3989.1 FEET MSL
20 MAY 66 Q231 HRS MST
ASCENSION NO. 357

WSTM SITE COORDINATES
E 488,587 FEET
N 185,645 FEET

WHITE SANDS SITE
TABLE VII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
63500.0	62.5	-64.0	0.	-0. **	104.1	563.1		255.5	7.4	1.000023
64000.0	61.0	-63.1	0.	-0. **	101.1	564.3		252.1	5.5	1.000023
64500.0	59.5	-63.7	0.	-0. **	98.9	563.5		256.3	5.2	1.000022
65000.0	58.0	-64.4	0.	-0. **	96.8	562.6		261.8	5.2	1.000022
65500.0	56.6	-65.0	0.	-0. **	94.7	561.8		264.1	5.0	1.000021
66000.0	55.2	-65.6	0.	-0. **	92.7	561.0		265.1	4.9	1.000021
66500.0	53.9	-63.4	0.	-0. **	89.5	563.9		272.0	4.2	1.000020
67000.0	52.6	-67.7	0.	-0. **	86.2	567.6		284.4	3.2	1.000019
67500.0	51.3	-59.2	0.	-0. **	83.5	569.5		318.9	3.0	1.000019
68000.0	50.1	-58.7	0.	-0. **	81.4	570.3		23.9	4.1	1.000018
68500.0	48.9	-58.1	0.	-0. **	79.2	571.0		63.7	5.6	1.000018
69000.0	47.7	-57.6	0.	-0. **	77.2	571.7		70.1	8.0	1.000017
69500.0	46.6	-57.1	0.	-0. **	75.1	572.4		76.9	10.2	1.000017
70000.0	45.5	-56.5	0.	-0. **	73.2	573.1		83.9	12.3	1.000016
70500.0	44.4	-56.3	0.	-0. **	71.4	573.4		92.1	12.3	1.000016
71000.0	43.4	-56.3	0.	-0. **	69.7	573.4		101.2	10.6	1.000016
71500.0	42.4	-56.3	0.	-0. **	68.1	573.4		106.1	9.3	1.000015
72000.0	41.4	-56.3	0.	-0. **	66.5	573.4		108.1	8.2	1.000015
72500.0	40.4	-56.3	0.	-0. **	64.9	573.4		115.4	7.7	1.000014
73000.0	39.4	-56.3	0.	-0. **	63.4	573.4		125.0	7.4	1.000014
73500.0	38.5	-56.3	0.	-0. **	61.9	573.4		130.6	8.7	1.000014
74000.0	37.6	-56.3	0.	-0. **	60.4	573.4		133.3	10.6	1.000013
74500.0	36.7	-56.3	0.	-0. **	59.2	573.4		140.5	11.4	1.000013
75000.0	35.9	-56.2	0.	-0. **	57.6	573.5		149.2	11.7	1.000013
75500.0	35.0	-55.9	0.	-0. **	56.2	574.0		159.8	10.5	1.000013
76000.0	34.2	-55.5	0.	-0. **	54.8	574.4		171.4	8.7	1.000012
76500.0	33.4	-55.2	0.	-0. **	53.4	574.9		184.8	7.0	1.000012
77000.0	32.6	-54.8	0.	-0. **	52.1	575.4		200.2	5.5	1.000012
77500.0	31.9	-54.4	0.	-0. **	50.8	575.8		214.8	3.9	1.000011
78000.0	31.1	-54.1	0.	-0. **	49.5	576.3		226.7	2.1	1.000011

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0230 HRS MST
ASCENSION NO. 357

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

3914014
WHITE SANDS SITE
TABLE VII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
78500.0	30.4	-53.7	0.	**	48.3	576.8	238.6	238.6	0.3	1.000011
79000.0	29.7	-53.4	0.	**	47.1	577.3	316.9	316.9	0.3	1.000010
79500.0	29.0	-53.0	0.	**	45.9	577.7	30.8	30.8	0.4	1.000010
80000.0	28.3	-52.0	0.	**	44.8	578.2	58.9	58.9	1.2	1.000010
80500.0	27.7	-52.3	0.	**	43.7	578.7	58.9	58.9	2.3	1.000010
81000.0	27.0	-51.9	0.	**	42.6	579.1	72.8	72.8	2.7	1.000009
81500.0	26.4	-51.6	0.	**	41.5	579.6	102.1	102.1	2.4	1.000009
82000.0	25.8	-51.2	0.	**	40.5	580.1	123.0	123.0	2.6	1.000009
82500.0	25.2	-50.9	0.	**	39.5	580.6	114.5	114.5	4.6	1.000009
83000.0	24.6	-50.5	0.	**	38.5	581.0	106.0	106.0	6.6	1.000009
83500.0	24.1	-50.1	0.	**	37.6	581.5	111.7	111.7	8.1	1.000008
84000.0	23.5	-50.0	0.	**	36.7	581.7	117.7	117.7	9.5	1.000008
84500.0	23.0	-49.8	0.	**	35.8	581.9	118.7	118.7	11.1	1.000008
85000.0	22.5	-49.6	0.	**	35.0	582.1	117.4	117.4	12.7	1.000008
85500.0	21.9	-49.5	0.	**	34.2	582.3	117.2	117.2	13.8	1.000008
86000.0	21.5	-49.3	0.	**	33.4	582.5	118.7	118.7	14.0	1.000007
86500.0	21.0	-49.2	0.	**	32.6	582.8	120.1	120.1	14.2	1.000007
87000.0	20.5	-49.0	0.	**	31.9	583.0	121.2	121.2	14.0	1.000007
87500.0	20.0	-48.8	0.	**	31.1	583.2	122.3	122.3	13.8	1.000007
88000.0	19.6	-48.7	0.	**	30.4	583.4	118.3	118.3	13.2	1.000007
88500.0	19.1	-48.5	0.	**	29.7	583.6	112.8	112.8	12.5	1.000007
89000.0	18.7	-48.4	0.	**	29.0	583.8	109.0	109.0	11.5	1.000006
89500.0	18.3	-48.2	0.	**	28.3	584.0	107.5	107.5	10.1	1.000006
90000.0	17.9	-48.1	0.	**	27.7	584.2	106.0	106.0	8.8	1.000006
90500.0	17.5	-47.9	0.	**	27.0	584.4	106.9	106.9	7.2	1.000006
91000.0	17.1	-47.7	0.	**	26.4	584.6	107.7	107.7	5.6	1.000006
91500.0	16.7	-47.6	0.	**	25.8	584.8	122.9	122.9	4.8	1.000006
92000.0	16.3	-47.4	0.	**	25.2	585.0	150.9	150.9	4.6	1.000006
92500.0	15.9	-47.3	0.	**	24.6	585.2	178.2	178.2	4.5	1.000005
93000.0	15.6	-47.1	0.	**	24.0	585.4	185.3	185.3	5.1	1.000005

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0230 HRS MST
ASCENSION NO. 357

WSIM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

3914014
WHITE SANDS SITE
TABLE VII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
93500.0	15.2	-46.9	**	23.4	585.6	192.3	5.6	1.000005
94000.0	14.9	-46.8	**	22.9	585.8	193.2	5.4	1.000005
94500.0	14.5	-46.6	**	22.4	586.0	188.7	4.5	1.000005
95000.0	14.2	-46.5	**	21.8	586.2	182.8	3.6	1.000005
95500.0	13.9	-46.3	**	21.3	586.5	137.3	3.7	1.000005
96000.0	13.6	-46.2	**	20.8	586.7	91.7	3.8	1.000005
96500.0	13.3	-46.0	**	20.4	586.9	67.8	9.7	1.000005
97000.0	13.0	-45.8	**	19.9	587.1	62.6	20.6	1.000004
97500.0	12.7	-45.7	**	19.4	587.3	57.9	30.9	1.000004
98000.0	12.4	-45.5	**	19.0	587.5	63.0	24.4	1.000004
98500.0	12.1	-45.4	**	18.5	587.7	68.1	17.9	1.000004
99000.0	11.8	-45.2	**	18.1	587.9	72.8	15.4	1.000004
99500.0	11.6	-45.0	**	17.7	588.1	77.1	16.3	1.000004
100000.0	11.3	-44.8	**	17.3	588.4	81.9	17.2	1.000004
100500.0	11.1	-44.5	**	16.9	588.8	117.0	16.0	1.000004
101000.0	10.8	-44.2	**	16.5	589.1	152.1	14.8	1.000004
101500.0	10.6	-43.9	**	16.1	589.5	160.4	14.6	1.000004
102000.0	10.3	-43.7	**	15.7	589.9	137.5	15.4	1.000003
102500.0	10.1	-43.4	**	15.3	590.2	114.0	16.3	1.000003
103000.0	9.9	-43.1	**	15.0	590.6	114.7	16.0	1.000003
103500.0	9.7	-42.8	**	14.6	590.9	117.3	15.5	1.000003
104000.0	9.5	-42.5	**	14.3	591.3	121.5	14.3	1.000003
104500.0	9.3	-42.3	**	14.0	591.7	128.6	11.6	1.000003
105000.0	9.0	-42.0	**	13.6	592.0	135.7	8.9	1.000003
105500.0	8.8	-41.7	**	13.3	592.4	135.1	7.2	1.000003
106000.0	8.7	-41.4	**	13.0	592.8	132.5	5.8	1.000003
106500.0	8.5	-41.1	**	12.7	593.1			1.000003
107000.0	8.3	-40.8	**	12.4	593.5			1.000003
107500.0	8.1	-40.6	**	12.1	593.8			1.000003
108000.0	7.9	-40.3	**	11.8	594.2			1.000003

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 20 MAY 66 0230 HRS MST
 ASCENSION NO. 357

UPPER AIR DATA
 3914014
 WHITE SANDS SITE
 TABLE VII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNUTS	KNUTS	DIRECTION DEGREES(TN)	SPEED KNUTS	
108500.0	7.7	-47.0	0.	-0. **	11.6	594.6				1.000003
109000.0	7.6	-39.7	0.	-0. **	11.3	594.9				1.000003

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA
3914013
WHITE SANDS SITE
TABLE VIII

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0810 HRS MST
ASCENSION NO. 360

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
3989.0	879.7	21.5	9.1	45.0	1035.1	670.0		240.0	2.9	1.000281
4000.0	879.4	21.4	9.0	44.8	1035.0	669.9		240.0	2.9	1.000281
4500.0	863.9	18.8	4.1	37.7	1027.4	666.5		238.7	3.4	1.000265
5000.0	848.6	18.2	3.3	36.8	1011.3	665.8		237.4	3.8	1.000260
5500.0	833.6	17.7	2.4	35.9	995.4	665.1		236.1	4.3	1.000254
6000.0	818.9	17.1	1.6	35.1	979.8	664.5		234.8	4.8	1.000249
6500.0	804.4	16.6	0.8	34.2	964.4	663.8		236.3	5.2	1.000244
7000.0	790.2	16.0	-0.1	33.4	949.3	663.1		240.0	5.8	1.000239
7500.0	776.1	15.1	-0.9	33.4	935.4	662.0		245.8	6.5	1.000235
8000.0	762.1	13.9	-1.6	34.1	922.5	660.6		251.9	7.4	1.000230
8500.0	748.4	12.7	-2.4	34.8	909.9	659.2		256.5	8.6	1.000226
9000.0	734.9	11.5	-3.3	35.5	897.4	657.7		261.0	9.5	1.000222
9500.0	721.7	10.3	-4.1	36.2	885.1	656.3		265.4	10.0	1.000219
10000.0	708.7	9.1	-4.9	36.9	873.0	654.9		269.9	10.2	1.000215
10500.0	695.5	7.8	-5.7	37.7	860.5	653.4		274.4	10.1	1.000211
11000.0	682.3	6.6	-6.6	38.4	848.0	652.0		277.6	9.0	1.000207
11500.0	669.5	5.4	-7.4	39.2	835.8	650.5		280.3	7.5	1.000203
12000.0	656.9	4.2	-8.3	40.0	823.7	649.0		286.0	4.6	1.000200
12500.0	644.5	2.9	-9.1	40.8	811.8	647.6		293.6	1.7	1.000196
13000.0	632.3	1.7	-10.0	41.6	800.1	646.1		28.2	2.6	1.000193
13500.0	620.4	0.5	-10.9	42.3	788.6	644.6		105.3	3.6	1.000189
14000.0	608.7	-0.7	-11.8	43.1	777.3	643.2		104.4	4.6	1.000186
14500.0	597.2	-2.0	-12.7	43.9	766.2	641.7		103.2	4.8	1.000183
15000.0	586.0	-3.2	-13.6	44.7	755.2	640.2		101.8	4.0	1.000179
15500.0	574.9	-4.4	-14.5	45.4	744.4	638.7		89.3	3.3	1.000176
16000.0	564.1	-5.6	-15.4	46.2	733.7	637.3		70.1	2.7	1.000173
16500.0	553.5	-6.8	-16.3	47.0	723.3	635.8		37.1	2.6	1.000170
17000.0	543.0	-8.1	-17.3	47.8	713.0	634.3		0.3	2.6	1.000167
17500.0	532.8	-9.3	-18.2	48.6	702.8	632.8		336.1	3.4	1.000165
18000.0	522.6	-10.4	-19.0	49.3	692.2	631.5		313.6	4.3	1.000162

UPPER AIR DATA

3914013
WHITE SANDS SITE
TABLE VIII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

STATION ALTITUDE 3909.0 FEET MSL
20 MAY 66 0810 HRS NST
ASCENSION NO. 360

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA	INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	
18500.0	512.3	-11.3	-19.7	50.1	681.0	630.4	285.3	5.0	1.000159
19000.0	502.2	-12.2	-20.4	50.9	670.0	629.3	258.8	6.0	1.000156
19500.0	492.3	-13.1	-21.1	51.7	659.1	628.1	242.5	8.5	1.000153
20000.0	482.6	-14.1	-21.8	52.5	648.4	627.0	229.7	10.9	1.000151
20500.0	473.0	-15.1	-22.6	53.2	638.2	625.7	227.3	13.4	1.000148
21000.0	463.5	-16.5	-23.8	53.6	628.7	624.1	227.4	15.5	1.000145
21500.0	454.2	-17.8	-24.9	54.1	619.2	622.5	232.7	16.6	1.000143
22000.0	445.1	-19.1	-26.0	54.5	609.9	620.9	238.8	17.4	1.000140
22500.0	436.1	-20.4	-27.2	55.0	600.8	619.2	247.1	17.5	1.000138
23000.0	427.2	-21.5	-28.7	55.9	591.2	617.8	254.7	17.6	1.000135
23500.0	418.4	-22.7	-30.2	56.7	581.8	616.4	260.4	17.4	1.000133
24000.0	409.9	-23.8	-31.8	48.5	572.6	614.9	265.2	17.1	1.000130
24500.0	401.4	-25.0	-33.3	46.4	563.5	613.5	266.6	16.6	1.000128
25000.0	393.0	-26.3	-34.8	45.4	554.6	611.8	267.2	16.1	1.000126
25500.0	384.6	-27.7	-36.2	44.7	545.9	610.1	264.6	15.6	1.000123
26000.0	376.5	-29.1	-37.7	44.0	537.4	608.3	261.9	15.2	1.000121
26500.0	368.5	-30.5	-39.1	43.4	529.1	606.6	259.0	15.2	1.000119
27000.0	360.7	-31.9	-40.6	42.7	520.8	604.8	256.5	15.3	1.000117
27500.0	353.0	-33.3	-42.0	42.0	512.8	603.1	255.0	15.5	1.000115
28000.0	345.5	-34.7	-43.4	41.3	504.8	601.3	253.6	15.5	1.000113
28500.0	338.2	-36.1	-44.9	40.6	497.0	599.5	252.4	15.0	1.000111
29000.0	331.0	-37.4	-46.3	39.4	489.1	597.9	251.4	15.1	1.000110
29500.0	323.8	-38.1	-48.1	34.9	479.9	597.0	250.6	15.7	1.000107
30000.0	316.7	-38.8	-49.9	30.5	470.9	596.1	250.4	17.5	1.000105
30500.0	309.6	-39.8	-51.5	27.9**	462.2	594.8	250.4	19.9	1.000103
31000.0	302.6	-40.8	-53.1	25.6**	453.7	593.6	249.7	22.8	1.000101
31500.0	295.8	-41.8	-54.7	23.3**	445.4	592.3	248.8	25.8	1.000099
32000.0	289.2	-42.7	-56.4	21.0**	437.2	591.1	250.5	28.3	1.000098
32500.0	282.7	-43.7	-58.2	18.7**	429.2	589.8	252.3	30.7	1.000096
33000.0	276.3	-44.7	-60.1	16.4**	421.4	588.5	254.2	31.5	1.000094

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0810 HRS MST
ASCENSION NO. 360

3914013

WHITE SANDS SITE

TABLE VIII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
33500.0	270.1	-45.7	14.1**	413.7	587.3	256.0	32.2	1.000092
34000.0	264.0	-46.7	11.8**	406.1	586.0	257.3	31.9	1.000091
34500.0	258.1	-47.7	9.5**	398.7	584.7	258.4	32.3	1.000089
35000.0	252.2	-48.6	7.2**	391.5	583.4	258.4	35.5	1.000087
35500.0	246.6	-49.6	4.9**	384.3	582.2	258.2	38.3	1.000086
36000.0	241.0	-50.6	2.6**	377.3	580.9	257.4	40.1	1.000084
36500.0	235.6	-51.6	0.3**	370.5	579.6	256.7	42.0	1.000083
37000.0	230.1	-52.4	-0.0**	363.1	578.6	256.5	44.8	1.000081
37500.0	224.7	-53.1	-0.0**	355.7	577.6	256.2	46.9	1.000079
38000.0	219.4	-53.8	-0.0**	348.5	576.7	255.3	46.1	1.000078
38500.0	214.2	-54.6	-0.0**	341.5	575.7	254.7	45.3	1.000076
39000.0	209.2	-55.3	-0.0**	334.6	574.7	254.5	44.4	1.000075
39500.0	204.3	-56.0	-0.0**	327.8	573.7	254.4	43.9	1.000073
40000.0	199.5	-56.8	-0.0**	321.2	572.8	254.4	43.7	1.000072
40500.0	194.8	-57.5	-0.0**	314.7	571.8	254.4	43.5	1.000070
41000.0	190.2	-58.2	-0.0**	308.3	570.8	254.4	43.3	1.000069
41500.0	185.7	-59.0	-0.0**	302.1	569.8	253.6	44.5	1.000067
42000.0	181.3	-57.5	-0.0**	292.9	571.8	252.5	46.3	1.000065
42500.0	177.0	-58.7	-0.0**	287.5	570.3	251.6	48.0	1.000064
43000.0	172.8	-58.1	-0.0**	280.0	570.9	250.8	49.8	1.000062
43500.0	168.7	-57.8	-0.0**	272.8	571.4	249.7	52.0	1.000061
44000.0	164.6	-58.6	-0.0**	267.4	570.3	248.5	54.3	1.000060
44500.0	160.7	-59.4	-0.0**	262.0	569.3	248.5	55.5	1.000058
45000.0	156.9	-59.5	-0.0**	255.8	569.1	249.2	56.0	1.000057
45500.0	153.1	-59.6	-0.0**	249.8	569.0	250.3	55.4	1.000056
46000.0	149.4	-59.7	-0.0**	243.9	568.9	251.7	53.9	1.000054
46500.0	145.8	-59.8	-0.0**	238.2	568.7	252.8	51.2	1.000053
47000.0	142.3	-59.9	-0.0**	232.6	568.6	253.6	47.3	1.000052
47500.0	138.9	-60.0	-0.0**	227.1	568.5	252.5	45.0	1.000051
48000.0	135.6	-60.1	-0.0**	221.7	568.4	249.8	44.1	1.000049

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3949.0 FEET MSL
 20 MAY 66 0310 HRS MST
 ASCENSION NO. 360

3914013
 WHITE SANDS SITE
 TABLE VIII (Cont)

WSIM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
48500.0	132.3	-60.2	0.	-0.	216.5	568.2		248.2	52.8	1.000048
49000.0	129.2	-61.5	0.	-0.	212.6	566.4		247.8	71.7	1.000047
49500.0	126.0	-60.4	0.	-0.	206.4	567.9		246.5	74.1	1.000046
50000.0	123.0	-60.0	0.	-0.	201.1	568.5		244.1	54.9	1.000045
50500.0	120.0	-61.2	0.	-0.	197.3	566.9		243.3	42.6	1.000044
51000.0	117.2	-62.3	0.	-0.	193.6	565.4		244.8	41.8	1.000043
51500.0	114.3	-62.0	0.	-0.	188.6	565.9		239.9	34.9	1.000042
52000.0	111.6	-61.5	0.	-0.	183.6	566.5		222.0	16.0	1.000041
52500.0	108.9	-61.0	0.	-0.	178.8	567.1		214.2	6.6	1.000040
53000.0	106.2	-60.5	0.	-0.	174.1	567.8		234.6	23.9	1.000039
53500.0	103.7	-61.4	0.	-0.	170.6	566.6		253.2	39.5	1.000038
54000.0	101.2	-62.3	0.	-0.	167.2	565.3		254.3	37.6	1.000037
54500.0	98.7	-63.4	0.	-0.	164.0	563.9		255.4	35.6	1.000037
55000.0	96.3	-64.6	0.	-0.	160.9	562.3		254.3	33.2	1.000036
55500.0	93.9	-65.8	0.	-0.	157.8	560.7		252.7	30.8	1.000035
56000.0	91.6	-66.3	0.	-0.	154.3	560.0		249.5	29.4	1.000034
56500.0	89.3	-66.3	0.	-0.	150.5	560.0		245.2	28.5	1.000034
57000.0	87.1	-66.3	0.	-0.	146.8	560.0		242.0	27.5	1.000033
57500.0	85.0	-66.3	0.	-0.	143.2	560.0		240.6	26.3	1.000032
58000.0	82.9	-66.3	0.	-0.	139.6	560.0		239.1	24.9	1.000031
58500.0	80.8	-66.3	0.	-0.	136.2	560.0		236.8	23.0	1.000030
59000.0	78.8	-66.3	0.	-0.	132.8	560.0		234.6	21.2	1.000030
59500.0	76.9	-66.3	0.	-0.	129.5	560.0		236.4	16.3	1.000029
60000.0	75.0	-66.3	0.	-0.	126.3	560.0		238.2	11.5	1.000028
60500.0	73.1	-66.3	0.	-0.	123.2	560.0		230.7	9.3	1.000027
61000.0	71.3	-66.3	0.	-0.	120.2	560.0		221.2	7.8	1.000027
61500.0	69.6	-66.3	0.	-0.	117.2	560.0		215.8	6.9	1.000026
62000.0	67.9	-66.3	0.	-0.	114.3	560.0		213.0	6.5	1.000025
62500.0	66.2	-66.3	0.	-0.	111.5	560.0		215.2	7.4	1.000025
63000.0	64.6	-65.9	0.	-0.	108.5	560.6		224.1	10.0	1.000024

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** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 20 MAY 66 0810 HRS MST
 ASCENSION NO. 360

UPPER AIR DATA
 3914013
 WHITE SANDS SITE
 TABLE VIII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES	DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION (TN) DEGREES	SPEED KNOTS	INDEX OF REFRACTION
63500.0	63.0	-65.4	0.	-0.	105.6	561.3	231.9	12.2	1.000024
64000.0	61.4	-64.9	0.	-0.	102.8	561.9	232.8	11.8	1.000023
64500.0	59.9	-64.4	0.	-0.	100.0	562.6	233.6	11.4	1.000022
65000.0	58.5	-62.3	0.	-0.	96.6	565.4	234.1	11.3	1.000022
65500.0	57.1	-57.5	0.	-0.	92.2	571.8	234.2	11.4	1.000021
66000.0	55.7	-57.2	0.	-0.	89.9	572.1	234.3	11.6	1.000020
66500.0	54.4	-57.2	0.	-0.	87.7	572.2	228.6	11.0	1.000020
67000.0	53.1	-57.1	0.	-0.	85.6	572.3	220.0	10.0	1.000019
67500.0	51.8	-57.1	0.	-0.	83.6	572.4	211.4	9.0	1.000019
68000.0	50.6	-57.0	0.	-0.	81.6	572.4	206.9	9.0	1.000018
68500.0	49.4	-57.0	0.	-0.	79.7	572.5	203.6	9.3	1.000018
69000.0	48.3	-56.9	0.	-0.	77.8	572.6	200.3	9.6	1.000017
69500.0	47.1	-56.9	0.	-0.	75.9	572.7	193.8	9.4	1.000017
70000.0	46.0	-56.8	0.	-0.	74.1	572.7	186.9	9.1	1.000016
70500.0	44.9	-56.7	0.	-0.	72.3	572.8	180.0	8.8	1.000016
71000.0	43.9	-56.7	0.	-0.	70.6	572.9	172.5	7.5	1.000016
71500.0	42.8	-56.4	0.	-0.	68.9	573.2	165.0	6.2	1.000015
72000.0	41.8	-56.2	0.	-0.	67.2	573.5	149.6	6.9	1.000015
72500.0	40.9	-56.0	0.	-0.	65.6	573.9	130.0	8.7	1.000015
73000.0	39.9	-55.7	0.	-0.	64.0	574.2	119.7	10.2	1.000014
73500.0	39.0	-55.5	0.	-0.	62.4	574.5	117.7	11.5	1.000014
74000.0	38.1	-55.2	0.	-0.	60.9	574.8	118.3	12.4	1.000014
74500.0	37.2	-55.0	0.	-0.	59.4	575.1	122.5	12.6	1.000013
75000.0	36.4	-54.8	0.	-0.	58.0	575.4	127.0	12.0	1.000013
75500.0	35.5	-54.5	0.	-0.	56.6	575.7	131.9	9.3	1.000013
76000.0	34.7	-54.3	0.	-0.	55.2	576.0	137.5	6.7	1.000012
76500.0	33.9	-54.1	0.	-0.	53.9	576.4	145.9	4.5	1.000012
77000.0	33.1	-53.8	0.	-0.	52.6	576.7	153.2	2.4	1.000012
77500.0	32.3	-53.6	0.	-0.	51.3	577.0	131.3	1.9	1.000011
78000.0	31.6	-53.3	0.	-0.	50.1	577.3	109.4	1.3	1.000011

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** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA

STATION ALTITUDE 3589.0 FEET MSL
20 MAY 66 0610 HRS MST
ASCENSION NO. 360

3914013
WHITE SANDS SITE
TABLE VIII (Cont)

WSTM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
78500.0	30.9	-53.1	0.	-0. **	48.9	577.6	164.6	0.8	1.000011	
79000.0	30.1	-52.9	0.	-0. **	47.7	577.9	226.6	0.4	1.000011	
79500.0	29.4	-52.6	0.	-0. **	46.5	578.2	201.6	0.6	1.000010	
80000.0	28.8	-52.4	0.	-0. **	45.4	578.5	130.8	1.2	1.000010	
80500.0	28.1	-52.1	0.	-0. **	44.3	578.9	69.6	1.7	1.000010	
81000.0	27.4	-51.9	0.	-0. **	43.2	579.2	83.8	1.6	1.000010	
81500.0	26.8	-51.7	0.	-0. **	42.2	579.5	98.0	1.4	1.000009	
82000.0	26.2	-51.4	0.	-0. **	41.2	579.8	106.9	1.3	1.000009	
82500.0	25.6	-51.2	0.	-0. **	40.2	580.1	109.0	1.2	1.000009	
83000.0	25.0	-51.0	0.	-0. **	39.2	580.4	111.0	1.2	1.000009	
83500.0	24.4	-50.7	0.	-0. **	38.2	580.7	103.3	1.8	1.000009	
84000.0	23.8	-50.5	0.	-0. **	37.3	581.0	92.3	2.6	1.000008	
84500.0	23.3	-50.2	0.	-0. **	36.4	581.3	82.3	3.4	1.000008	
85000.0	22.8	-50.0	0.	-0. **	35.5	581.6	86.5	5.0	1.000008	
85500.0	22.2	-49.8	0.	-0. **	34.7	582.0	90.6	6.6	1.000008	
86000.0	21.7	-49.5	0.	-0. **	33.8	582.3	93.3	8.0	1.000008	
86500.0	21.2	-49.3	0.	-0. **	33.0	582.6	94.0	9.1	1.000007	
87000.0	20.7	-49.1	0.	-0. **	32.2	582.9	94.6	10.2	1.000007	
87500.0	20.2	-48.8	0.	-0. **	31.4	583.2	96.7	11.1	1.000007	
88000.0	19.8	-48.4	0.	-0. **	30.7	583.8	99.4	11.9	1.000007	
88500.0	19.3	-47.7	0.	-0. **	29.9	584.7	102.1	12.6	1.000007	
89000.0	18.9	-47.0	0.	-0. **	29.1	585.6	102.7	13.3	1.000006	
89500.0	18.5	-46.3	0.	-0. **	28.4	586.5	103.1	14.0	1.000006	
90000.0	18.1	-45.6	0.	-0. **	27.7	587.3	103.7	14.8	1.000006	
90500.0	17.7	-44.9	0.	-0. **	26.9	588.2	104.9	15.7	1.000006	
91000.0	17.3	-44.2	0.	-0. **	26.3	589.1	106.1	16.6	1.000006	
91500.0	16.9	-43.9	0.	-0. **	25.6	589.6	105.4	17.0	1.000006	
92000.0	16.5	-44.0	0.	-0. **	25.1	589.4	102.2	16.7	1.000006	
92500.0	16.1	-44.2	0.	-0. **	24.5	589.2	99.0	16.5	1.000005	
93000.0	15.8	-44.4	0.	-0. **	24.0	588.9	95.9	15.8	1.000005	

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL
 20 MAY 66 0810 HRS MST
 ASCENSION NO. 360

UPPER AIR DATA
 3914013
 WHITE SANDS SITE
 TABLE VIII (Cont)

WSTM SITE COORDINATES
 E 488,580 FEET
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
93500.0	15.4	-44.6	0.	-0. **	23.5	588.7		92.7	14.8	1.000005
94000.0	15.1	-44.7	0.	-0. **	23.0	588.5		89.6	13.9	1.000005
94500.0	14.7	-44.9	0.	-0. **	22.5	588.2		88.6	13.3	1.000005
95000.0	14.4	-45.1	0.	-0. **	22.0	588.0		88.0	12.8	1.000005
95500.0	14.1	-45.3	0.	-0. **	21.5	587.8		88.5	12.3	1.000005
96000.0	13.8	-45.4	0.	-0. **	21.1	587.6		100.8	11.4	1.000005
96500.0	13.5	-45.5	0.	-0. **	20.6	587.5		113.1	10.6	1.000005
97000.0	13.2	-45.0	0.	-0. **	20.1	588.1		122.2	10.0	1.000004
97500.0	12.9	-44.5	0.	-0. **	19.6	588.7		122.0	10.0	1.000004
98000.0	12.6	-44.0	0.	-0. **	19.1	589.4		121.8	10.0	1.000004
98500.0	12.3	-43.5	0.	-0. **	18.7	590.0		122.5	10.0	1.000004
99000.0	12.0	-43.0	0.	-0. **	18.2	590.7		125.1	10.3	1.000004
99500.0	11.8	-42.5	0.	-0. **	17.8	591.3		127.8	10.6	1.000004
100000.0	11.5	-42.0	0.	-0. **	17.4	591.9		128.4	10.9	1.000004
100500.0	11.3	-41.5	0.	-0. **	16.9	592.6		120.7	11.4	1.000004
101000.0	11.0	-41.0	0.	-0. **	16.5	593.2		113.1	11.8	1.000004
101500.0	10.8	-40.6	0.	-0. **	16.1	593.8		107.1	12.3	1.000004
102000.0	10.5	-40.1	0.	-0. **	15.7	594.5		113.0	12.2	1.000004
102500.0	10.3	-39.6	0.	-0. **	15.4	595.1		119.0	12.0	1.000003
103000.0	10.1	-39.1	0.	-0. **	15.0	595.8		124.7	11.9	1.000003
103500.0	9.9	-38.7	0.	-0. **	14.6	596.2		121.8	10.8	1.000003
104000.0	9.6	-38.5	0.	-0. **	14.3	596.5		118.9	9.7	1.000003
104500.0	9.4	-38.3	0.	-0. **	14.0	596.8		116.0	8.6	1.000003
105000.0	9.2	-38.0	0.	-0. **	13.7	597.1		114.3	8.1	1.000003
105500.0	9.0	-37.8	0.	-0. **	13.4	597.4		112.7	7.6	1.000003
106000.0	8.8	-37.5	0.	-0. **	13.1	597.7		111.1	7.1	1.000003
106500.0	8.6	-37.3	0.	-0. **	12.8	598.0		103.3	6.7	1.000003
107000.0	8.5	-37.1	0.	-0. **	12.5	598.3		93.1	6.2	1.000003
107500.0	8.3	-36.8	0.	-0. **	12.2	598.6		82.9	5.8	1.000003
108000.0	8.1	-36.6	0.	-0. **	11.9	598.9		77.4	6.1	1.000003

STATION ALTITUDE 3989.0 FEET MSL
20 MAY 66 0810 HRS MST
ASCENSION NO. 360

UPPER AIR DATA
3914013
WHITE SANDS SITE
TABLE VIII (Cont)

WSIM SITE COORDINATES
E 488,580 FEET
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
108500.0	7.9	-36.4	0.	-0. **	11.7	599.2		75.8	7.0	1.000003
109000.0	7.8	-36.1	0.	-0. **	11.4	599.5		74.1	7.8	1.000003
109500.0	7.6	-35.9	0.	-0. **	11.1	599.8		74.3	8.1	1.000002
110000.0	7.4	-35.7	0.	-0. **	10.9	600.1		77.5	7.4	1.000002
110500.0	7.3	-35.4	0.	-0. **	10.7	600.4		80.8	6.8	1.000002
111000.0	7.1	-35.2	0.	-0. **	10.4	600.7				1.000002
111500.0	7.0	-34.9	0.	-0. **	10.2	601.0				1.000002
112000.0	6.8	-34.7	0.	-0. **	9.9	601.3				1.000002
112500.0	6.7	-34.5	0.	-0. **	9.7	601.6				1.000002
113000.0	6.5	-34.2	0.	-0. **	9.5	601.9				1.000002
113500.0	6.4	-34.0	0.	-0. **	9.3	602.2				1.000002
114000.0	6.2	-33.8	0.	-0. **	9.1	602.5				1.000002
114500.0	6.1	-33.5	0.	-0. **	8.9	602.8				1.000002

** AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

RELEASE TIME (MST)		IMPACT DISPLACEMENT IN MILES DUE TO WIND								THEORETICAL IMPACT IN MILES FROM LAUNCHER			
		143- 4000 FT				20000- 100000 FT						TOTAL	
		N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W				
RAWINSONDE		PIBAL	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	
R ₁ 0230	R 0230	P 0510	46.0S	4.8W	3.2N	7.6W	8.5S	8.3W	51.3S	20.7W	12.7N	2.9W	
R ₂ 0500	R 0230	P 0540	38.0S	4.9W	1.6N	6.2W	8.5S	8.3W	44.9W	19.4W	19.1N	1.6W	
R ₂ 0500	R 0230	P 0610	8.8S	6.5W	1.6N	6.2W	8.5S	8.3W	15.7S	21.0W	48.3N	3.2W	
R ₂ 0500	R ₃ 0500	P 0630	3.0S	2.3W	1.6N	6.2W	4.4S	7.2W	5.8S	15.7W	58.2N	2.1E	
R ₂ 0500	R ₃ 0500	P 0650	4.1S	1.4W	1.6N	6.2W	4.4S	7.2W	6.9S	14.8W	57.1N	3.0E	
R ₂ 0500	R ₃ 0500	P 0710	3.7S	1.3E	1.6N	6.2W	4.4S	7.2W	6.5S	12.1W	57.5N	5.7E	
R ₂ 0500	R ₃ 0500	P 0725	4.9S	4.4W	1.6N	6.2W	4.4S	7.2W	7.7S	17.8W	56.3N	0.0	
R ₂ 0710	R ₃ 0500	P 0738	3.2S	3.2W	1.3N	6.8W	4.4W	7.2W	6.3S	17.2W	57.7N	0.6E	
R ₂ 0710	R ₃ 0500	P 0750	5.0S	8.0W	1.3N	6.8W	4.4S	7.2W	8.1S	22.0W	55.9N	4.2W	
R ₂ 0710	R ₃ 0500	P 0800	10.0S	9.0W	1.3N	6.8W	4.4S	7.2W	13.1S	23.0W	50.9N	5.2W	
R ₂ 0710	R ₃ 0500	P 0805	11.5S	9.3W	1.3N	6.8W	4.4S	7.2W	14.6S	23.3W	49.4N	5.5W	
*R ₁ 0810	*R 0810	*P 0811	7.6S	8.2W	2.6N	3.6W	4.5S	8.7W	9.5S	20.5W	54.5N	2.7W	

TIME: 0810 MST
DATE: 20 MAY 1966

TABLE IX. IMPACT PREDICTION DATA
AEROBEE NASA 4.95 GS

* = Post-Shoot Data
P = Double Theodolite Winds (143-4,000 FT)
R = Rawinsonde Winds (Above 20,000 FT)
R₁ = Rawinsonde Winds (4,000-20,000 FT)
R₂ = Rawin Winds (4,000-20,000 FT)
R₃ = Rawin Winds (Above 20,000 FT)

JACK SETTINGS FOR LAUNCHER A	West leg	29	inches
	East leg	19	inches
LAUNCHER SETTING	Tilt	4.00	degrees
	Azimuth	019.3	degrees
TILT COMPONENTS	North	3.77	degrees
	East	1.32	degrees
NO WIND IMPACT FROM LAUNCHER	North	64.0	miles
	East	17.8	miles

PREDICTED IMPACT FROM LAUNCHER	North	50.0	miles
	West	5.0	miles
PREDICTED BOOSTER IMPACT FROM LAUNCHER	Azimuth	020	degrees
	Distance	1,650	feet
RECOMMENDATION - Fire, with 95% confidence of impacting on range, based upon: wind correction of 28 miles 1-hr wind variability of 14 miles 20 May 1966/0805 MST			

TABLE X. ACTUAL AND PREDICTED LAUNCH DATA
AEROBEE NASA 4.95 GS

SOTIM IMPACT FROM LAUNCHER	North	40.8	miles
	West	5.9	miles
ACTUAL BOOSTER IMPACT FROM LAUNCHER	Azimuth	N/A	degrees
	Distance	N/A	feet

*

TABLE XI. IMPACT DATA
AEROBEE NASA 4.95 GS

* Sonic observation of trajectory and impact of missiles

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1. ORIGINATING ACTIVITY (Corporate author) U. S. Army Electronics Command Fort Monmouth, New Jersey		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED
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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY U. S. Army Electronics Command Atmospheric Sciences Laboratory White Sands Missile Range, New Mexico	
13. ABSTRACT Meteorological data gathered for the launching of Aerobee NASA 4.95 GS are presented for the National Aeronautics and Space Administration. and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.		

14.	KEY WORDS	LINK A		LINK B		LINK C	
		ROLE	WT	ROLE	WT	ROLE	WT
	1. Ballistics 2. Meteorology 3. Wind						

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